AMENDMENTS TO THE CLAIMS:

Please amend claims 1-6, 9-12, 16-22, 24-26, 28-30 and 32-34 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) An optical waveguide structure comprising:

a core layer having a first refractive index n_{core}, ~~and~~

a plurality~~an array~~ of sub-regions within the core layer, said core layer sub-regions having a second refractive index n_{rods}, wherein n_{rods}-$n_{core} > 0.1$, said core layer sub-regions arranged in at least one array, the array of core layer sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprise a photonic band structure within the core layer for propagating an optical mode traveling through said waveguide structure, ~~wherein:~~

~~n_{rods}-$n_{core} > 0.1$~~

a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core} > n_{cladding}$, and

a plurality of sub-regions within the cladding layer, said cladding layer sub-regions contiguous with said core layer sub-regions.

2. (currently amended) An optical waveguide structure according to claim 1, wherein the waveguide structure is a planar waveguide structure, the core layer being formed between ~~a~~said cladding layer and a buffer layer, ~~the cladding layer having a third refractive index $n_{cladding}$,~~ and the buffer layer having a fourth refractive index, n_{buffer}, where~~in:~~

~~$n_{rods} >$~~ $n_{core} >$ ~~$n_{cladding}$ and n_{buffer}~~.

3. (currently amended) An optical waveguide structure according to claim 1, wherein the waveguide structure is an optical fibre, ~~further comprising a~~ said cladding layer comprising an annular layer ~~having a third refractive index $n_{cladding}$,~~ surrounding the core layer~~, wherein:~~

~~$n_{rods} > n_{core} > n_{cladding}$.~~

4. (currently amended) An optical fibre according to claim 3, wherein the cladding layer is planarised in the vicinity of the ~~array~~plurality of cladding layer and core layer sub-regions~~, the array of sub-regions extending through the planarised cladding layer and into the core layer~~.

5. (currently amended) An optical waveguide structure according to claim 1, wherein the ~~array~~core layer and cladding layer of sub-regions ~~gives rise to~~provides a photonic bandgap.

6. (currently amended) An optical waveguide structure according to claim 1, wherein the core layer sub-regions are formed from silicon.

7. (original) An optical waveguide structure according to claim 1, wherein the core layer is formed from silicon nitride, silicon oxynitride, doped silica, tantalum pentoxide or doped tantalum pentoxide.

8. (previously presented) An optical waveguide structure according to claim 2, wherein the cladding layer is formed from silicon dioxide.

9. (currently amended) A planar optical waveguide structure according to claim 2, wherein the cladding layer sub-regions ~~extend through the cladding layer as well~~comprise the same material as the core layer sub-regions.

10. (currently amended) A planar optical waveguide structure according to claim 2, further comprising a plurality of sub-regions in said buffer layer, ~~wherein the sub-regions extend partially into~~ the buffer layer sub-regions are continuous with said core layer sub-regions.

11. (currently amended) An optical waveguide structure according to claim ~~2~~1, wherein the cladding layer ~~includes~~ sub-regions ~~corresponding to the sub-regions in the core layer, having~~have a refractive index which is greater than or equal to the refractive index of the cladding layer but which is less than or equal to the refractive index of the core layer.

12. (currently amended) An optical waveguide structure according to claim 1, wherein the ~~array of~~core layer sub-regions are arranged in a square lattice.

13. (original) An optical waveguide structure according to claim 1, wherein the core layer includes a waveguiding region having no sub-regions.

14. (currently amended) An optical waveguide structure according to claim 13, wherein the waveguiding region includes a bend.

15. (original) An optical device incorporating an optical waveguide structure according to claim 1.

16. (currently amended) A method of manufacturing ~~a~~an optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

forming ~~an array~~a plurality of holes in the core layer extending longitudinally along the waveguide; and

filling the holes with a material having a second refractive index n_{rods}, wherein:

$$n_{rods}-n_{core} > 0.1$$

providing a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core}>n_{cladding}$, and

providing a plurality of holes within the cladding layer, said cladding layer holes contiguous with said core layer holes.

17. (currently amended) A method according to claim 16, wherein the optical waveguide is a planar waveguide and said core layer has at least two sides, the method further including the steps of:

providing a buffer layer having a refractive index n_{buffer} on one side of the core layer; and

the step of providing ~~a~~said cladding layer ~~having a refractive index $n_{cladding}$,~~, provides said cladding layer on the other side of the core layer, wherein:

$n_{rods} > n_{core} > n_{cladding}$ and n_{buffer}.

18. (currently amended) A method according to claim 16, wherein the optical waveguide is an optical fibre, the method further including the steps of:

providing ~~a~~said cladding layer ~~having a refractive index $n_{cladding}$.~~ surrounding the core layer, wherein:

$$n_{rods} > n_{core} > n_{cladding}.$$

19. (currently amended) A method of guiding an optical signal comprising the step of passing an optical signal through a waveguiding region of an optical waveguide structure comprising:

a core layer having a first refractive index n_{core}, ~~and~~

an array of sub-regions within the core layer extending longitudinally along the waveguide having a second refractive index, n_{rods}, the array of sub-regions ~~giving rise to~~comprising a photonic band structure within the core layer, wherein:

$n_{rods}-n_{core} > 0.1$

a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core}>n_{cladding}$, and

a plurality of sub-regions within the cladding layer, said cladding layer sub-regions contiguous with said core layer sub-regions.~~.~~

20. (currently amended) A method according to claim 19, wherein the waveguide is a planar waveguide, wherein the core layer is formed between a cladding layer and a buffer layer, ~~the cladding layer having a third refractive index $n_{cladding}$,~~ and the buffer layer having a fourth refractive index, n_{buffer}, and where~~in~~:

~~$n_{rods} > n_{core} > n_{cladding}$ and n_{buffer}.~~

21. (currently amended) A method according to claim 19, wherein the optical waveguide is an optical fibre, wherein ~~a~~said cladding layer ~~has a third refractive index $n_{cladding}$, and~~ surrounds the core layer, and wherein:

$$n_{rods} > n_{core} > n_{cladding}.$$

22. (currently amended) An optical waveguide structure comprising

a core layer, said core layer having a first refractive index n_{core}, ~~and~~

a 2-dimensional array of sub-regions within the core layer, said core layer sub-regions having a second refractive index n_{rods}, the array of core layer sub-regions extending longitudinally along the waveguide and ~~giving rise to~~comprising a photonic band structure within the core layer, wherein:

$n_{rods} > n_{core}$

a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core} > n_{cladding}$, and

a plurality of sub-regions within the cladding layer, said cladding layer sub-regions contiguous with said core layer sub-regions.

23. (original) An optical waveguide structure according to claim 22, wherein $n_{rods} - n_{core} > 0.1$.

24. (currently amended) An optical waveguide structure according to claim 22, wherein the waveguide structure is a planar waveguide structure, the core layer being formed between ~~a~~said cladding layer and a buffer layer, ~~the cladding layer having a third refractive index $n_{cladding}$~~, and the buffer layer having a fourth refractive index n_{buffer}, wherein:

~~$n_{rods} >$~~ $n_{core} >$ ~~$n_{cladding}$ and~~ n_{buffer}.

25. (currently amended) An optical waveguide structure according to claim 22, wherein the waveguide structure is an optical fibre, ~~further comprising a~~said cladding layer ~~having a third refractive index $n_{cladding}$,~~ surrounding the core layer~~, wherein:~~

~~$n_{rods} > n_{core} > n_{cladding}$~~.

26. (currently amended) A method of manufacturing a optical waveguide structure comprising the steps of:

providing a core layer having a first refractive index n_{core};

forming a 2-dimensional array of holes in the core layer extending longitudinally along the waveguide structure;

filling the holes with a material having a second refractive index n_{rods}, wherein:

$$n_{rods} > n_{core}$$

providing a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core} > n_{cladding}$, and

providing a plurality of holes within the cladding layer, said cladding layer holes contiguous with said core layer holes.

27. (original) A method according to claim 26, wherein n_{rods}-$n_{core} > 0.1$.

28. (currently amended) A method according to claim 26, wherein the optical waveguide is a planar waveguide and said core layer has at least two sides, the method further including the steps of:

providing a buffer layer having a refractive index n_{buffer} on one side of the core layer; and

the step of providing ~~a~~said cladding layer ~~having a refractive index $n_{cladding}$,~~ on the other side of the core layer, wherein:

$$n_{rods} > n_{core} > n_{cladding} \text{ and } n_{buffer}.$$

29. (currently amended) A method according to claim 26, wherein the optical waveguide is an optical fibre, the method further including the steps of:

providing ~~a~~said cladding layer ~~having a refractive index $n_{cladding}$,~~ surrounding the core layer, wherein:

$$n_{rods} > n_{core} > n_{cladding}.$$

30. (currently amended) A method of guiding an optical signal comprising the step of passing an optical signal through a waveguiding region of an optical waveguide structure comprising:

a core layer, said core layer having a first refractive index n_{core}, ~~and~~

a 2-dimensional array of sub-regions within the core layer extending longitudinally along the waveguide having a second refractive index n_{rods}, the array of sub-regions ~~giving rise to~~comprising a photonic band structure within the core layer, wherein:

$$n_{rods} > n_{core}$$

a cladding layer, said cladding layer located adjacent said core layer, said cladding layer having a thrd refractive index, $n_{cladding}$, where $n_{core} > n_{cladding}$, and

a plurality of sub-regions within the cladding layer, said cladding layer sub-regions contiguous with said core layer sub-regions.

31. (original) A method according to claim 30, wherein $n_{rods} - n_{core} > 0.1$.

32.(currently amended) A method according to claim 30, wherein the waveguide is a planar waveguide, wherein the core layer is formed between ~~a~~said cladding layer and a buffer layer, ~~the cladding layer having a third refractive index $n_{cladding}$,~~ and the buffer layer having a fourth refractive index n_{buffer}, and wherein:

$$~~n_{rods}~~ > n_{core} > ~~n_{cladding}~~ ~~and~~ n_{buffer}.$$

33. (currently amended) A method according to claim 30, wherein the optical waveguide is an optical fibre, wherein ~~a~~said cladding layer ~~has a third refractive index $n_{cladding}$, and~~ surrounds the core layer, and wherein:

$$n_{rods} > n_{core} > n_{cladding}.$$